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BEDROCK AND SURFICIAL GEOLOGY
OF
THE VILLAGE OF GONDOLA POINT,
KINGS COUNTY, NEW BRUNSWICK

prepared for: Community Planning Branch
Department of Municipal Affairs
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To Accompany Report:

Map Plate: 84-483 - Bedrock Geology, Village of Gondola Point, Kings County, N.B. by D. Ball, 1981 (21 H/5) Scale 1"=¼ mile.

84-484 - Surficial Geology, Village of Gondola Point, Kings County, N.B. by D. Ball, 1981 (21 H/5) Scale: 1"=¼ mile.

BEDROCK AND SURFICIAL GEOLOGY OF THE VILLAGE OF GONDOLA POINT, KINGS COUNTY, NEW BRUNSWICK

INTRODUCTION

This report and accompanying maps of the bedrock and surficial geology of the Village of Gondola Point, Kings County, New Brunswick were prepared at the request of Mr. T. J. Jellinek, Director of the Community Planning Branch, Department of Municipal Affairs.

The findings discussed in this report and depicted on the accompanying maps (Plates 1 and 2) were derived from four sources. In-field observations made on the ground in the Village of Gondola Point coupled with the interpretation of aerial photographs taken in 1976 form the basis for the report. In addition, references to previously published data dealing with both the bedrock and the surficial geology of the Village and its surrounding areas were used to place the field observations into the context of the regional geology. Details of the depth of the surficial material in the Village were enlarged upon by perusal of "driller's logs" made available by Mr. R. Brinsmead of the Water Resources Branch, Department of the Environment.

BEDROCK GEOLOGY

The Village of Gondola Point is underlain by sedimentary rocks of the Lower Mississippian (van de Poll, 1970) (Horton Series), Kennebecasis Formation. These rocks, mapped on Plate 1, consist of shales, siltstones, sandstones and conglomerates. The finer grained rocks are predominantly brick red in colour but locally contain both alteration zones which are shades of mottled green to grey in colour and beds of buff coloured caliche limestones. The coarser grained clastics are varying shades of red, buff and grey-green colouration depending upon grain size, composition and degree of weathering. The beds of the Kennebecasis Formation which underlie the Village average less than one metre in thickness, strike in a northeasterly direction and dip on average 45° (80° maximum) to the northwest.

The Kennebecasis Formation within the Village boundary has been divided into three units. Unit "a" consists of brick red shales, siltstones and fine to medium grained sandstones. Beds of mottled green to grey coloured alteration zones and buff coloured caliche limestones are present locally. The shales and siltstones tend to fracture and rubblize in surface outcrop whereas the interbedded sandstones tend to retain their competency. Unit

"b" consists of interbedded brick red shales, siltstones, fine to very coarse grained cross-bedded lithic and arkosic sandstones and pebble to cobble polymictic conglomerates. The conglomerates and coarse grained sandstones weather to a grey and to a grey-green colour although they exhibit a dark red colouration on the fresh surface. Differential surface weathering of individual rock fragments produce a distinctive vuggy character to the conglomerates although they are very competent rocks displaying poor porosity. Unit "c" consists of interbedded very coarse grained cross-bedded arkosic sandstones and pebble to cobble conglomerate with an arkosic sandstone matrix. The fragments which make up the rocks of this Unit consist of metasediments and metavolcanics displaying varying shades of green and grey colouration, maroon coloured lithic fragments, quartz and potassium feldspar. The distinctive feature of the Unit is its "granitic" appearance which is due to the preponderance of quartz and potassium feldspar fragments.

The nature of these Units is such that Unit "a" tends to erode whereas Unit "c" tends to be resistant to erosion and Unit "b" falls between these two extremes of erosional potential. The result is that Unit "a" is found exposed in topographic lows and Unit "c" is exposed on topographic highs with Unit "b", as expected, exposed on topography

intermediate to these two extremes.

SURFICIAL GEOLOGY

The bedrock cover in the Village of Gondola Point, where present, consists of a maximum of two metres of glacial till. This cover is an extension of Unit "B" mapped by Ruitenberg and Finamore (1979) as an ablation till-bedrock complex. The thin nature of this cover is most evident on the heights of land within the Village which are currently undergoing residential development. Such topographic highs have the least amount of bedrock cover in the natural state and mechanical denudation enhances this fact. Examples of such surficial erosion are evident along the eastern boundary of the Village off Vincent Road accessed via Logan Drive, Yandall Drive and Legend Lane. Similarly, the northwesterly facing slope running the length of the Village and overlooking the Kennebecasis River tends to be very thinly covered although the bedrock cover is slightly thicker than the areas cited above which parallel the Village boundary. The southeast slopes of the headlands at Gondola Point and Harmon Point, facing Matthew Cove and Forester Cove, respectively, tend to be rather steep-sided, having no till cover and are littered with bedrock

derived boulders, in places of very large magnitude (±8 metres³).

Six rather small deposits of modern surficial material are outlined on Plate 2. Five of these consist of shallow water deposits which are generally fine-grained and occur in poorly drained marshlands. Although four consist of typical swamplands, the fifth, at the southern end of Gondola Boulevard, consists predominantly of peat and is the source for Saunders Brook as well as other minor streams. The sixth deposit, at the northern head of Gondola Point is a modern estuarine deposit consisting of gravelly sand to sand.

ECONOMIC GEOLOGY

No deposits of any minerals of economic significance have been found in the sedimentary red beds of the Kennebecasis Formation (Carroll, 1976a & 1976b). Similarly, no deposits of any granular resources of economic significance have been found as part of the bedrock cover within the Village of Gondola Point (Finamore and Lohse, 1977). The findings of this study do not alter these circumstances, therefore, the Village need not concern itself unduly with conflicting with any potential future nonrenewable

mineral resource development.

ENVIRONMENTAL GEOLOGY

The Kennebecasis Formation is such that the quantity of available ground water is limited by the porosity and permeability of the lithologies of the Formation, which at best are not those from which large quantities of water can be pumped. In particular, the finer grained clastics (shales) would be expected to be rather poor sources of water supply. The yields presently available from wells drilled in the Kennebecasis Formation average 4 to 6 gallons per minute (Reuitenberg and Finamore, 1979). It is doubtful that any wells drilled in the Kennebecasis Formation anywhere within the Village limits, given the thin surficial cover, would yield water quantities suitable for municipal scale water systems. The yields available at present must be protected by conservation of the vegetation cover which in turn protects the thin surficial cover. The surficial cover acts as the "sponge" which prevents rapid water run-off and allows local ground water recharge. Removal of the vegetation cover and surficial cover by residential development will reduce the quantity of ground water available.

The quality of the water supply must be protected from domestic sewage and solid waste (sanitary landfill) disposal. The strike and dip of the bedding, the thin surficial cover and the local topography combine to produce the effect that residential development on higher topography will affect the water supply quantity and quality on lower topography. The Village recognizes these problems and realizes the importance of communal sewage disposal (P. Pearson, ADI Ltd., personal communication, 1981) as opposed to private disposal. The contracting of solid waste disposal to a site removed from the Village (R. Benoit, Department of the Environment, personal communication, 1981) should be continued for the same reasons. No site within the Village boundary, given the bedrock and surficial geology, is suitable for a sanitary landfill site without resultant ground water contamination.

CONCLUSIONS

The bedrock of the area which makes up the Village of Gondola Point consists of red shales, siltstones, sandstones and conglomerates of the Lower Mississippian Kennebecasis Formation.

The material which makes up the bedrock cover in the Village of Gondola Point consists of a maximum of two metres of ablation till. This cover is very limited in thickness to nearly absent in all areas of topographic high within the Village.

No deposits of economically significant nonrenewable mineral resources are likely to be found within the boundaries of the Village.

Ground water resources available within the Village are limited, locally recharged and susceptible to locally produced quality and quantity problems.

RECOMMENDATIONS

The Village of Gondola Point must protect from erosion the thin surficial bedrock cover which exists in the area, with particular attention being paid to drainage ditch erosion. Land owners should be urged to retain what vegetation cover exists on their properties and be encouraged to add stablized surficial cover in the form of lawns. Clear cutting, particularly of steeply sloped ground, as has occurred on the highlands overlooking Meehans Cove, should be discouraged especially in areas where close spaced residential development is anticipated.

The disposal of domestic sewage must be handled with care and the central system presently in place must be maintained and enlarged to meet the demand of increased residential development.

The location of a sanitary landfill site at any location within the Village limits should be avoided as the nature of the surficial and bedrock geology are such that ground water contamination would certainly result.

F. D. Ball
Three-D GeoConsultants Limited
December, 1981

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